



Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
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Kevin H. Bronson
Site Vice President

February 12, 2009

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

SUBJECT: Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
Docket No.: 50-293
License No.: DPR-35

Licensee Event Report 2008-007-00

LETTER NUMBER: 2.09.005

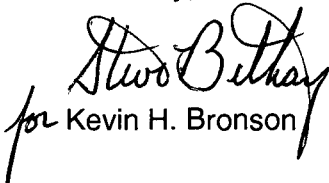
Dear Sir or Madam:

The enclosed Licensee Event Report (LER) 2008-007-00, "Momentary Loss of all 345kv Off-Site Power to the Startup Transformer from Switchyard Breaker Fault" is submitted in accordance with 10 CFR 50.73.

This letter contains no commitments.

Please do not hesitate to contact Mr. Joseph R. Lynch, (508) 830-8403, if there are any questions regarding this submittal.

Sincerely,


for Kevin H. Bronson

RMB
Enclosure

cc: Mr. James S. Kim, Project Manager
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IESA
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Enclosure to Letter Number 2.09.005
(6 pages)

LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME

PILGRIM NUCLEAR POWER STATION

2. DOCKET NUMBER

05000-293

3. PAGE

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4. TITLE

Momentary Loss of all 345kv Off-Site Power to the Startup Transformer from Switchyard Breaker Fault

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
12	20	2008	2008	007	00	02	12	2009	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	05000

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check all that apply)
N	20.2201(b) 22.2203(a)(3)(i) 50.73(a)(2)(i)(C) 50.73(a)(2)(vii)
10. POWER LEVEL	22.2202(d) 20.2203(a)(3)(ii) 50.73(a)(2)(ii)(A) 50.73(a)(2)(viii)(A)
0	20.2203(a)(1) 20.2203(a)(4) 50.73(a)(2)(ii)(B) 50.73(a)(2)(viii)(B)
	20.2203(a)(2)(i) 50.36(3)(1)(i)(A) 50.73(a)(2)(iii) 50.73(a)(2)(ix)(A)
	20.2203(a)(2)(ii) 50.36(3)(1)(ii)(A) X 50.73(a)(2)(iv)(A) 50.73(a)(2)(x)
	20.2203(a)(2)(iii) 50.36(c)(2) 50.73(a)(2)(v)(A) 73.71(a)(4)
	20.2203(a)(2)(iv) 50.46(a)(3)(ii) 50.73(a)(2)(v)(B) 73.71(a)(5)
	20.2203(a)(2)(v) 50.73(a)(2)(i)(A) 50.73(a)(2)(v)(C) OTHER
	20.2203(a)(2)(vi) 50.73(a)(2)(i)(B) 50.73(a)(2)(v)(D) Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME

Joseph R. Lynch – Licensing Manager

TELEPHONE NUMBER (Include Area Code)

508-830-8403

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
C	FK	52	G080	N					

14. SUPPLEMENTAL REPORT EXPECTED

YES (If yes, complete 15. EXPECTED SUBMISSION DATE) X NO

15. EXPECTED SUBMISSION DATE

MONTH DAY YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On Saturday, December 20, 2008 at approximately 1045 hours and while in a Hot Shutdown condition from the previous day's reactor scram (Reference LER 2008-006-00), Pilgrim Station experienced a momentary loss of all 345kv off-site power to the Startup Transformer (SUT) X4. As a result, the following safety system automatic actuations occurred: Reactor Protection System (RPS) actuation (all control rods were previously inserted), start of both Emergency Diesel Generators (EDG) and loading of their respective emergency buses, actuation of Primary Containment Isolation Systems (PCIS) Groups I, II, VI and Reactor Building Ventilation. The High Pressure Coolant Injection (HPCI) System was placed in service for reactor pressure control, and Reactor Core Isolation Cooling (RCIC) System was placed in service for reactor level control. All plant systems functioned as designed and expected.

The direct cause of the momentary loss of all 345kv off-site power was a Phase B to ground fault on the switchyard Line 355 bus section (Bridgewater Station) which caused ACB-102 and ACB-103 breakers to trip. The ACB-103 breaker tripped because it received a remote transfer trip signal from Auburn Street Station owned by the transmission system operator, National Grid (NGRID). The ground fault was cleared by the ACB-102 breaker, and the Bridgewater Station breakers (the ACB-105 breaker was already open from the previous day's reactor scram), however, the ACB-103 breaker should not have tripped. Tripping of ACB-102 and ACB-103 resulted in a loss of the SUT and transferring of the safety busses to the EDGs.

Immediate corrective actions taken included a visual inspection for damage which was completed with satisfactory results and a successful carrier test was performed on the Line 342 to and from Pilgrim Station. Additionally, a ground overcurrent relay was reset at the Auburn Street Station. Corrective actions planned include working with local Transmission and Distribution Companies to review and reset line protection relays based on investigation results.

The event posed no threat to public health and safety.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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NARRATIVE

BACKGROUND

Pilgrim Station is connected to the New England Power Grid through a 345kv ring bus located within the station's 345kv switchyard. The 345kv ring bus connects the output of the main transformer, the SUT, Line 355, and Line 342. There are four gas circuit breakers which comprise Pilgrim's 345kv ring bus: ACB-102, ACB-103, ACB-104 and ACB-105.

Line 355 is a two terminal line which connects Pilgrim to NGRID's Bridgewater Station and is connected to ACB-102 and ACB-105. Line 342 is a three terminal line, which connects Pilgrim to the Canal Power Plant's Switchyard in Sandwich, MA and to Auburn Street Station Switchyard in Whitman, MA. The Canal Switchyard is owned and operated by NSTAR and Auburn Street Station Switchyard is owned and operated by NGRID. Pilgrim's ACB-103 and ACB-104 connect Line 342 to the plant's switchyard. The 345kv system is the Pilgrim Station output power connection and also is the preferred off-site source via the SUT. See attached sketch for switchyard breaker arrangement. (The ACB's are identified by their last digit only).

The 345kv ring bus design locates the power transmission lines such that a failure of any one line will not result in the loss of the other line. Specifically, with both transmission lines in service, a failure of either 345kv line will not result in a main generator trip, a SUT trip, or a failure of the other 345kv line. Either of the two 345kv lines is capable of carrying full station output and supplying station loads via the SUT.

The 345kv system protective relaying is designed and coordinated to isolate system disturbances and minimize the impact to the overall transmission system. The protective systems are comprised of a primary and secondary protection scheme and are divided into four zones of protection.

- The main transformer (bounded by ACB-104 and ACB-105)
- The SUT (bounded by ACB-102 and ACB-103)
- Line 355 (bounded by ACB-102 and ACB-105 and Bridgewater Station)
- Line 342 (bounded by ACB-103 and ACB-104 and Auburn Street Station Street and Canal Stations)

When ACB-104 and ACB-105 open, the main transformer is isolated from the 345kv transmission system thus resulting in a generator full load reject event.

During normal station start-ups and shutdowns, the station's 4160V demands are supplied by the New England Power Grid through the SUT. Once the station main generator is synchronized to the New England Power Grid, the station UAT supplies all station 4160V demands, with the SUT maintained in standby, (the preferred off-site source) ready to provide 4160V power from the New England Power Grid if necessary.

If a disturbance occurs on Line 342 within the protective zone of the Auburn Street Station directional ground overcurrent protection, it will send a transfer trip signal to Pilgrim and Canal Stations to open their associated Line 342 breakers to clear the disturbance. In the case of Pilgrim, the ACB-103 and ACB-104 breakers would be opened. At the time of the December 20, 2008 disturbance, ACB-104 was open because Pilgrim was off-line and breaker ACB-105 was damaged by the December 19, 2008 disturbance.

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NARRATIVE

EVENT DESCRIPTION

On December 20, 2008 at 1045 hours, a flashover of a phase B arc horn on the Line 355 bus section occurred due to accumulated snow falling from the overhead bus and bridging the gap to the arc horn. (This is the Direct Cause of this event.) In response to this, ACB-102 opened per design, but ACB-103 opened in response to a transfer trip signal from the Auburn Street Station, which is associated with Line 342. Since the fault was not on Line 342, Auburn Street Station should not have sent this transfer trip signal. The tripping of the ACB-102 and ACB-103 resulted in a loss of the SUT supply and transferring of Pilgrim's safety busses to the EDGs. Subsequently, Lines 342 and 355 re-energized, ACB-102 and ACB-103 auto reclosed, and remained closed per design.

The plant was in a hot shutdown condition with the mode switch in the REFUEL position (to support front panel checks) with the reactor at 0 percent power due to a flashover on ACB-105 during the previous day's severe winter storm which caused a turbine generator trip and load reject approximately 16 hours earlier (Ref. LER 2008-006-00). Reactor pressure was \approx 546 psig decreasing. Two sea water pumps, one condensate pump and one reactor feed pump were in operation for heat removal from the reactor. The following is a time sequence of equipment operation when power from the SUT was lost:

- i. 10:45 – Switchyard breakers ACB-102 and ACB-103 opened and subsequent momentary loss of the SUT.
- ii. 10:45 - EDG's A & B auto started and re-energized busses A5 & A6. Power was lost to Busses A1-A4, and the operating sea water, condensate and reactor feed pumps tripped.
- iii. 10:52 - RCIC was placed in service for level and pressure control.
- iv. 11:14 - HPCI was placed in service to augment reactor pressure control.
- v. 11:14 - RHR pump "A" was manually started to support torus cooling operations.
- vi. 11:16 - RHR pump "B" was manually started to support torus cooling operations.

Plant Operations kept the EDG's in service for several hours to supply power to the emergency busses due to this grid disturbance before successfully returning the busses to their normal electrical system line-up.

An eyewitness account by personnel performing an infrared thermographic survey of the ACB-102 disconnect switch in the switchyard observed a flashover at the ACB-102 Line 355 phase B arc horn. This was caused by accumulated snow falling from the overhead bus and bridging the gap to the arc horn, initiating the flashover. ACB-103 and ACB-102, (in that order), auto reclosed, and re-energized the SUT.

Per plant design, when a fault occurs on Line 355 or its associated switchyard bus section, ACB-102 and ACB-105 open automatically to isolate the fault in response to both Pilgrim Station and Bridgewater protective relaying. ACB-103 should remain closed and continue to supply power to the SUT. The directional ground overcurrent relay (DGOR) at Auburn Street Station, which is designed to respond to a disturbance up to 85 percent of Line 342 length, responded to the Line 355 fault and sent the transfer trip to the Pilgrim and Canal Line 342 breakers. This transfer trip signal should not have occurred for such a fault. It was subsequently determined that a relay at Auburn Street Station caused the inadvertent trip.

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The NRC Operations Center was notified of the event in accordance with 10 CFR 50.72 (b) (3) (iv) (A) at 1707 hours on December 20, 2008 via Event Report Number 44737. Due to the fact that power from an off-site source remained available from the 23kv Shutdown Transformer, the criteria for declaration of an Unusual Event were not met (Pilgrim EAL 6.3.2.1).

CAUSE

The root cause of this event was an inadequate DGOR setting on the Auburn Street Station Line 342. This relay initiated a Line 342 transfer trip signal to open ACB-103 which resulted in the momentary loss of the SUT. The initiating event was a flashover of a Phase B arc horn on the Line 355 bus section due to accumulated snow falling from the overhead bus and bridging the gap to the arc horn, causing ACB-102 to trip per design; ACB-103 opened shortly after in response to a transfer trip signal from the Auburn Street Station. The tripping of the ACB-102 and ACB-103 resulted in a loss of the SUT supply and transferring of Pilgrim's safety busses to the EDGs.

CORRECTIVE ACTION

The following corrective actions have been taken:

A visual inspection of the switchyard and switchyard relay panels was performed to see if any damage occurred and was completed with satisfactory results.

Additional corrective action taken by the Auburn Street Station facility owner was to reset the DGOR based on the actual fault current seen at Auburn Street Station during the December 20, 2009 disturbance plus margin. The Auburn Street Station facility owner also validated the calibration of the Digital Fault Recorder, which was reported to be accurate.

Subsequent to the trip, NSTAR coordinated a test of the carrier system between Pilgrim, Auburn Street Station and Canal Stations. This test sends the carrier signal back and forth to test integrity of the circuit and signal strength. The test was satisfactory.

Pilgrim requested a review of the fault currents reported during the disturbance against the transmission system model for the system configuration at the time and is awaiting results.

Formal correspondence to National Grid has requested a summary of their actions to resolve this issue and prevent future recurrence

The following corrective actions are planned:

Continue to work with the interconnection transmission owner, Auburn Street Station facility owner, and the transmission operator to verify the root cause of the tripping of the Auburn Street Station DGOR and to ensure this potential does not exist at other Pilgrim line terminal ends and evaluate the process to be used by the transmission owner and operators to prevent future occurrences.

These corrective actions are being tracked in the Corrective Action Program (CAP) under Condition Report CR-PNP-2008-3980.

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NARRATIVE**SAFETY CONSEQUENCES**

The condition posed no threat to public health and safety.

This event is considered non-significant because power was maintained automatically to the emergency busses by the EDG's. The plant remained within its design basis at all times, and all safety systems responded automatically if required or manually upon demand. Cooling to the reactor, including pressure and temperature control were maintained by the manual start and operation of the RCIC and HPCI systems.

However, this event is considered noteworthy because it caused a loss of cooling through the main condenser, and it would have caused a reactor scram if the plant had been operating. There was no adverse impact on nuclear, radiological or industrial safety.

REPORTABILITY

This report is submitted in accordance with 10 CFR 50.73(a) (2) (iv) (A).

SIMILARITY TO PREVIOUS EVENTS

A review of Condition Reports for the past 10 years indicates that there are not any events where a loss of both lines to the SUT occurred as a result of any relay malfunction.

However, it should be noted that only two other station loss of offsite power events occurred in the past 22 years. The first was in 1987 and is documented in LER 87-14-01. The second was during a blizzard in April, 1997, and is documented in LER 97-07-01. As with this most recent event, the plant was not on-line for either of the other two, so none of the events challenged the safe shutdown of the reactor from power.

The risk to the plant from this type of event is the loss of the preferred power source. This event is analyzed and is within the design basis of the plant.

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for Components and Systems referenced in this report are as follows:

COMPONENTS	CODES
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Circuit Breaker, AC (ACB-102)	52
Relay, differential protective	87

SYSTEMS	
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Switchyard System (Startup Transformer)	FK
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